

# Space News Roundup

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No. 11



JSC Photo by Mark Sowa

JSC Director Aaron Cohen talks to a small group of JSC employees Tuesday, sharing his perspective on recent events surrounding the space program and the changing Washington climate.

## Cohen confident NASA can redesign station

'Unless we restructure, we're not going to have a space station'

By Kelly Humphries

JSC Director Aaron Cohen told a cross-section of the JSC civil service work force this week that he is convinced America will not have a space station if NASA can't come up with a redesign that will work.

"From my perspective, from where I sit and what I've seen, the space station is going to be restructured," Cohen told the 56 employees who gathered for an open forum Tuesday in Bldg. 1, Rm. 966. "Unless we restructure space station, we're not going to have a space station."

After explaining that the current Washington climate precludes

cost overruns for any reason and acknowledging that putting together a space station that can be built for less money by the end of the decade is a big challenge, Cohen insisted that he remains optimistic about the prospects for NASA and JSC.

It's going to be a lot of hard work, he said, "but I think we can do it."

One of the hardest things to do, he said, will be to develop a completely new way of managing projects so that they are completed on time and on budget in spite of underestimated costs, contractor rate changes, technical changes and funding uncertainty.

"If you have any ideas, I'd sure like to hear what they are," he said.

Cohen said he wanted to be as honest and realistic as he could to help employees around the center understand the challenges that JSC and NASA face in the coming month, and the employees at the first of two sessions responded by asking pointed questions.

In response to a variety of specific questions about what the space station redesign team is looking at, he said that everything is on the table for discussion, including the configuration, management, contracts, work package structure and center responsibilities.

The 35-member team headed Please see **COHEN**, Page 4

## Organizational changes hone program focus

A series of organizational changes to improve the focus on programs and enhance external relationships were announced recently by NASA Administrator Daniel S. Goldin.

The changes particularly target NASA science and exploration programs and the agency's relations with American industry, academia, government and non-government laboratories, and international partners.

"Science and exploration are what NASA is all about," Goldin said. "These changes will reestablish that focus."

In a move to strengthen the top-level management of the agency, Goldin has named John R. Dailey as acting deputy administrator. He replaces Aaron Cohen, who has been serving in that post since February 1992. Dailey has been associate deputy administrator since November 1992 after retiring from a distinguished 36-year career in the Marine Corps.

New program offices for Life and Microgravity Sciences and Applications, Advanced Concepts and Technology, Planetary Science and Astrophysics and Mission to Planet Earth have been formally established.

Dr. Harry C. Holloway, deputy dean of the Uniformed Services University of the Health Sciences, Bethesda, Md., has been named associate administrator for life and microgravity sciences and applications. He has been chairman of the NASA Aerospace Medicine Advisory Committee since 1988 and a member of NASA's U.S./U.S.S.R. Joint Working Group on Space Biology and Medicine.

JSC Astronaut Bonnie J. Dunbar, Ph.D., a veteran of three space flights with a doctorate in biomedical engineering, will assist Holloway.

Dr. Arnauld E. Nicogossian will become deputy associate administrator for space flight activities, life and microgravity sciences and applications. He is presently chief medical officer in NASA's Office of Space Flight.

"The President wants the current space station redesigned as part of a program that is more efficient and effective, and capable of producing greater returns on our investment.

The redesigned space station must provide for significant long-duration space research in materials and life sciences during this decade," Goldin said. "To assure the right emphasis in the redesign effort and also within NASA, I am elevating life and microgravity sciences and applications to report directly to the administrator, and I am bringing all of the elements together into a strong organization."

Dr. Wesley Huntress will become associate administrator for planetary science and astrophysics. He was named as acting in that position in October and previously had been director of the Solar System Exploration Division.

The new Mission to Planet Earth Office will be headed by Dr. Shelby G. Tilford, named as the acting associate administrator. The MTPE office will consist of divisions for flight systems, for operation, data and information systems, and for science.

The administrator also has taken Please see **RECK**, Page 4

## Scientists discuss craters, planets, meteorites

By Kari Fluegel

Discussions of craters, planets and meteorites replaced sounds of the referee's whistle at the Gilruth Center this week as about 750 scientists met for the 24th annual Lunar and Planetary Science Conference.

The conference gives researchers from around the world the opportunity to discuss the latest findings and theories about Earth, the solar system and the formation

of the universe.

The focus of several discussions this year was the large impact crater in the Yucatan that many believe was created by a catastrophic collision between a large meteorite and Earth 65 million years ago, an event that led to the extinction of about 70 percent of the planet's species including all dinosaurs at the end of the Mesozoic era.

One study focused on gravity data

used to establish the shape and deep structure of the Chicxulub Impact Basin on the Yucatan coast. The crater is the leading candidate as the source crater of the catastrophe that occurred at the time known as the Cretaceous-Tertiary (K-T) Boundary.

A combination of reprocessed Bouguer (a technique for measuring gravity on land) and free-air gravity data reveals that the structure is a multi-ring basin, 200-km in diameter,

with at least three concentric rings. The spacing of the rings follows the rule scientists have observed from studying multi-ring basins on other planets. The most highly magnetic zone lies in the central ring, which could result from deep rocks being melted and uplifted by the impact.

Researchers led by Virgil Sharpton of the Lunar and Planetary Institute interpret the weakly circular northwest quadrant of the crater as the superpo-

sition of the impact onto an older linear gravity high, rather than a post-impact fault as assumed by other workers. They said that such a feature may have resulted from processes that tore the Yucatan Peninsula away from the southern United States as the Gulf of Mexico opened during the Jurassic era.

Also of interest at the conference were the latest data sets provided by Please see **GALILEO**, Page 4

## Columbia crew in good spirits as count begins

By James Hartsfield

Preparations for *Columbia's* scheduled liftoff at 8:52 a.m. CST Sunday were smooth as the countdown began.

Commander Steve Nagel, Pilot Tom Henricks, Mission Specialists Jerry Ross, Charles Precourt and Bernard Harris, and German Payload Specialists Ulrich Walter and Hans Schlegel were to begin 12-hour shifts to operate Spacelab D-2 around the clock.

"Our spirits are good," Nagel said as the crew arrived at Kennedy Space Center on Wednesday,

acknowledging that a planned February launch had been delayed. "We've put the time to good use and

done extra study, extra training and we're all set to go. This is a very exciting mission, it's a very important mission."

Payload operations for the orbiting laboratory will be overseen from a control center in Oberpfaffenhofen, Germany.

Experiments include investigations into crystal growth, robotics, materials processing and the effects of weightlessness on plants, animals, individ-

Please see **COLUMBIA**, Page 4



NASA Photo

Kennedy Space Center's Richard Irby and Ed Rieck work to reinstall the hydraulic flex hoses in *Columbia's* aft engine compartment following a break that forced a cleanup and changeout. Irby is a quality control inspector, and Rieck a Lockheed mechanical technician.

## JSC workers earn NASA's top honors

Outstanding individuals and teams at JSC received NASA's highest tributes Friday afternoon during the NASA Honor Awards Ceremony in Teague Auditorium. The awards were presented by JSC Director Aaron Cohen.

Former astronaut Donald K. Slayton received the NASA Distinguished Service Medal in a special presentation.

Several of the awards were presented at NASA Headquarters, including the Distinguished Service Medals that went to Astronauts Charles F. Bolden Jr., Robert L. Gibson, Richard N. Richards and Loren J. Shriver, and the Distinguished Public Service Medal. Please see **JSC**, Page 4

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# Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Gift Store from 10 a.m.-2 p.m. weekdays. For more information, call x35350 or x30990.

- Walt Disney on Ice (noon, March 27, Summit): \$9.
- NASA Night at Astroworld (6 p.m.-midnight, April 2): \$9.95 for first 5,000.
- Astroworld Early Bird Special — Tickets purchased before May 31 and used before June 30 at \$15.95.
- Fiesta Texas, San Antonio — Discount tickets: adult, \$18.35; child (4-11) \$12.75.
- Space Center Houston — Discount tickets: adult, \$7.50; child (3-11) \$4.50; commemorative: \$8.75.
- Metro tickets — Passes, books and single tickets available.
- Movie discounts — General Cinema, \$4.50; AMC Theater, \$3.75; Loews Theater, \$4.
- Entertainment '93 and Gold C coupon books, stamps, Walt Disney Club memberships, business cards, stamps and souvenirs also available.
- Upcoming events: Galveston Home Tours, May 1, 2, 8 and 9; Easter Party, April 10; Bluebonnet Bus Trip, April 3, 18; Deep Sea Fishing, April 17.

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# Gilruth Center News

**Sign up policy** — All classes and athletic activities are first come, first served. Sign up in person at the Gilruth Center and show a badge or EAA membership card. Classes tend to fill up four weeks in advance. For more information, call x30304.

**EAA badges** — Dependents and spouses may apply for photo identification badges from 6:30-9 p.m. Monday through Friday. Dependents must be between 16 and 23 years old.

**Defensive driving** — Course is offered from 8 a.m.-4:30 p.m. April 17. Cost is \$19.

**Weight Safety** — Required course for employees wishing to use the Gilruth weight room is offered from 8-9:30 p.m. March 25. Pre-registration is required; cost is \$5.

**Aerobics** — High/low-impact classes meet from 5:15-6:15 p.m. Tuesdays and Thursdays. Cost is \$32 for eight weeks.

**Exercise** — Low-impact class meets from 5:15-6:15 p.m. Mondays and Wednesdays. Cost is \$24 for eight weeks.

**Aikido** — Martial arts class meets Tuesdays from 6:15-8 p.m. Cost is \$15 per month.

**Scuba** — Four-week session meets Tuesdays and Thursdays beginning March 25 at the Gilruth Center. Total cost is \$190, with \$50 paid at registration.

**Fiction workshop** — Five-week creative writing class meets Wednesdays beginning March 31. Cost is \$80.

**Softball tournament** — The Pre-season Men's Open C Softball Tournament will be March 27-28 at the Gilruth. Entry deadline is 7 p.m. March 25; cost is \$95 per team.

**Softball sign-ups** — Openings are available for softball teams to sign up in the mixed C recreational, men's C, men's A and men's over 40 leagues. Call x30304 for more information.

**Fitness program** — Health Related Fitness Program includes medical examination screening, 12-week individually prescribed exercise program. Call Larry Weir, x30301.

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# Dates & Data

## Today

**Lunch and learn** — The American Institute of Aeronautics and Astronautics' Communications and Tracking and Technical Committee and the Institute of electrical and Electronics Engineers' Communication Society Chapter will host a joint technical meeting at 11:30 a.m. March 22 in the Gilruth Center. Dr. George D. Arndt, chief of JSC's Electromagnetic Systems Branch, will discuss "High Temperature Superconducting Applications in Space." For more information, call Kumar Krishen at 283-5875, or Y.C. Loh at 333-6725.

**Lunch and learn** — The American Institute of Aeronautics and Astronautics' Materials, Structures and Dynamics Technical Committee will meet at 11:30 a.m. March 22 in Lockheed Plaza 1, Rm. 12C. The SAFER Team will discuss various aspects of its design. For additional information, call Gillian Shepherd at 333-6239 or Don Probe at 333-6278.

**Cafeteria menu** — Special: breaded outlet. Entrees: beef chop suey, Polish sausage with potato salad. Soup: French onion. Vegetables: okra and tomatoes, green peas.

## Tuesday

**Cafeteria menu** — Special: fried chicken. Entrees: Salisbury steak, shrimp Creole. Soup: split pea. Vegetables: mixed vegetables, beets, whipped potatoes.

## Wednesday

**Toastmasters meet** — The Space-land Toastmasters Club will meet at 7 a.m. March 24 at the House of Prayer Lutheran Church. For additional information, call Jim Morrison at 480-9793.

**WAR '93** — The 1993 Workshop on Automation and Robotics, presented by JSC's Automation and Robotics Division and the American Institute of

Aeronautics and Astronautics Houston Section Automation and Robotics Technical Committee, will be from 9 a.m.-2:30 p.m. March 24 at the Gilruth Center. This year's theme is "Intelligent, Dexterous Robotics." The workshop is free, but a luncheon is \$8. To register, call Mary Stewart at x31724, or fax questions to x37580.

**AIAA meets** — The American Institute of Aeronautics and Astronautics will meet at 5:30 p.m. March 24 in the Gilruth Center. Peter J. Rots, senior director of engineering and technical publications for Continental Airlines, will discuss "Engineering in the Airline Industry." Cost is \$8.50 for members, \$9.50 for nonmembers, \$7.50 for students. Deadline for dinner reservations is noon March 19; call 333-6064, 280-1500, x31350 or 282-3160. For additional information, call Steve Zobel at 283-4246.

**AFCEA meets** — The Armed Forces Communications and Electronics Association will meet at 11:30 a.m. March 24 at the Holiday Inn on NASA Road 1. Dr. Terence Finn, senior policy analyst at NASA Headquarters, will speak. Cost is \$12 for members, \$14 for nonmembers. Call Linda Hinton at 282-7682 for additional information.

**Freedom Fighters meet** — The Space Station Freedom Fighters will meet at noon and 5 p.m. March 24 in Rm. 160 of the McDonnell Douglas Tower, Space Center Blvd. and Bay Area Blvd. For more information, call David Cochran at 482-7005.

**Astronomy seminar** — The JSC Astronomy Seminar will feature an open discussion meeting at noon March 24 in Bldg. 31, Rm. 129. For additional information, call Al Jackson at 333-7679.

**Cafeteria menu** — Special: stuffed bell pepper. Entrees: fried catfish with hush puppies, braised beef rib, barbe-

cue plate, wieners and beans, shrimp salad. Soup: seafood gumbo. Vegetables: corn O'Brian, rice, Italian green beans.

## Thursday

**SOLE meets** — The Houston chapter of the Society of Logistics Engineers will meet at 5:30 p.m. March 25 at the South Shore Harbour Country Club. Chris Hetmaniak, Jim Van Laak, Kevin Watson and Ken Zingrebe will present Part 3 of a review of the 5th Space Station Logistics Symposium papers. Dinner is \$8. For reservations, call x44674, 333-6710, x40085, x30913 or x33661.

**Cafeteria menu** — Special: barbecue smoked link. Entrees: beef stroganoff, turkey and dressing. Soup: chicken noodle. Vegetables: Lima beans, buttered squash and Spanish rice.

## Friday

**JAIPCC '93** — The University of Houston-Clear Lake, the Instrument Society of America and the Institute of Electrical and Electronics Engineers will host a Joint Applications in Instrumentation, Process and Computer Control 1993 Symposium on March 26 at UHCL. For additional information, call Lawler at x32037, or Dr. Thomas Harman at 283-3774.

**Cafeteria menu** — Special: meat sauce and spaghetti. Entrees: baked scrod, liver and onions, fried shrimp. Soup: seafood gumbo. Vegetables: green beans, buttered broccoli, whipped potatoes.

## Monday

**Cafeteria menu** — Special: wieners with baked beans. Entrees: beef chop suey, breaded outlet with cream gravy, grilled ham steak. Soup: beef and barley. Vegetables: buttered rice, Brussels sprouts, whipped potatoes.

# Swap Shop

Swap Shop ads are accepted from current and retired NASA civil service employees and on-site contractor employees. Each ad must be submitted on a separate full-sized, revised JSC Form 1452. Deadline is 5 p.m. every Friday, two weeks before the desired date of publication. Ads may be run only once. Send ads to Roundup Swap Shop, Code AP3, or deliver them to the deposit box outside Rm. 147 in Bldg. 2. No phone or fax ads accepted.

## Property

- Sale: LC lot, 82' x 130', \$10k. x36514.
- Sale: Bandera/Hill Country, 1 acre lot in development w/pool, Medina River frontage, utilities. Plaché, x39034 or 474-2660.
- Sale: Dickinson Bayou waterfront, 4-2.5-2, pool, trees, sec sys, 3/4 acre, FB, WB, \$224.9k. x34354 or 337-1640.
- Rent: Boat slip on Clear Lake, roof, motorized boat hoist for pwr boats, \$125/mo. 474-4922.
- Rent: Galveston beach house, furn, CA/C, day/wk. Ed Shumilak, x37686 or 326-4795.
- Sale: Hunt, TX, 5+ acres, 3-2, FPL in LR and MBR, vaulted ceilings, water access, \$150k. 280-8792.
- Sale: South Shore Harbour, 3-2-2, lg island kitchen w/breakfast rm, lg living areas, deck w/ceiling fan, Jacuzzi, \$113.9k. Bob, x33057 or 538-3431.
- Rent: LC, 3-2-2, FPL, fence, no pets, \$795/mo. 554-6200.
- Sale: Clear Lake Shores, 3-2-3, 2-story, loft, game rm, FPL, decks, trees, boatslip, \$122.5k. 538-1849.
- Rent: New Orleans condo in French Quarter, Jazz Festival Wk, Apr 23-30, priv rooftop deck, furn, sleeps 4, \$500. 282-6422 or 280-8927.
- Rent: Galveston condo, furn, sleeps 6, Seawall Blvd & 61st St, wkly/wknd/dly rates. Magdi Yassa, 333-4760 or 486-0788.
- Sale: Piper's Meadow, 3-2-2, oversized lot, pvt patio w/Jacuzzi, wood deck, \$82.5k. 280-0415.
- Sale: Sycamore Valley, 3-2-2, new carpet, vinyl, lg kitchen, den, LR, French drs, 1800 sq ft, \$75.9k. Ann Marie, 333-1700, x202 or 481-5465.
- Sale: Bay Glen, 3-2.5-2, game rm, 2055 sq ft, oversized corner lot, \$114,900. Lidia, 486-7518.
- Lease: Countryside North, 2 story, 2.5 bath, corner lot, mauve carpet, avail Apr 1. 244-8366 or 326-1390.
- Sale: Meadowbend 3-2-2, lg cul-de-sac lot, ex cond, FPL, Jacuzzi, \$70's. Rick, 282-3941.
- Lease/Sale: Nassau Bay TH, 4-2-2, 2000 sq ft, lg garage, master dn, new car-

pet, tile, paint, 2-story den, deck, \$1190/mo or \$119.9k. Jerry, x38922 or 488-5307.

## Cars & Trucks

- '86.5 4x4 kg cab Nissan PU, blk, AM/FM/ cass, tinted window, ex cond, \$6k; '59 Chevy PU for parts or restoration. 334-2335
- '85 Honda Accord htchbk, auto, 86k mi., blue, AC, new tires, ex stereo, ex engine, needs body work, \$2500 OBO. Beth, x33078.
- Sale: '65 F-85 Olds, body in good cond, engine needs work, \$500 nego. 481-4571.
- '76 Cadillac, runs good, \$450. 482-3033.
- '89 S-10 Blazer, ex cond, sport pkg, blk/grey, full pwr, \$8700. x31250.
- '86 Toyota Supra, sunroof, 5 spd, perf pkg, ex cond, 60k mi, \$6500 OBO. Bob Adams, x32567 or 488-3314.
- '84 Volvo, 760 Turbo, 5 spd, sunroof, leather int, low mi, ex cond, \$6490. 943-9685.
- '79 Datsun 280ZX, new paint, 92k mi, \$2200. x32458 or 333-9518.
- '91 GMC Sierra SLE, ext cab, loaded, ex cond, 25k mi, \$15k OBO. Scott, 333-7637 or 538-2067.
- '70 Mercedes Benz 280S, 4 dr sedan, pwr windows, AC, auto, new Michelins, AM/FM/cass, ex cond, \$7k. 488-2000.
- '90 Ford Escort, 4 dr htchbk, AC, AM/FM/cass, auto, pwr steering, good cond, 43k mi, \$6500 OBO. Mary Beth, x30439 or 286-7388.
- '79 Pontiac Bonneville, V8 auto, replaced timing chain, brakes, fuel pump, 100k mi, \$1300 OBO. 486-4745.
- '92 Suzuki Sidekick Jeep, turquoise, low mi, standard, ex cond, \$1500 take up pmts. 738-8140.
- '85 Honda Accord, 4 dr, pwr steering, brakes, new tires, mech ex, \$1475 OBO. 474-4506.
- '87 Cadillac Brougham de Elegance, low mi, metallic grey, leather, loaded, \$7500. 488-6014.
- '82 Oldsmobile Regency, needs rear main seal, no rust, \$1300 OBO. x36156 or 534-3279.
- '79 Fiat XI/9, gold, good cond, \$1500. x37010 or 334-2612.
- '86 Nova (Toyota), auto, AC, AM/FM, ex cond, \$2.7k. Helen, x38511 or 480-4196.
- '87 Ford Tempo, good cond, \$1000. 538-1051.
- '84 Firebird SE, blk. 774-4321.

## Boats & Planes

- Sailable 18' canoe w/sail, flexible ABS shell, line new, mountable on top of car, \$450. Minh, x30992 or 484-2456.
- Stainless prop for Johnson OB, 13.5 OD x 17 pitch, \$100. Andy, 332-9105.

- '88 Galaxy, 16' open bow, new interior, OMC 140, \$4500. Gregg, x31250.
- Windsurfer, 2 sails, \$375. Bill, 554-6242.
- Mistral Ventura sailboard, 6.0m camber induced Mistral sail, 5.2m RAF Fanatic sail, booms, mast, \$1000 OBO. Ed or Sue, 645-9406.
- '76 16' Invader trihull, '85 Yamaha 90 HP motor, low hrs, galv trlr, \$2200. x39290 or 947-9385.

## Cycles

- '84 Honda XL100, \$500. 332-0330.
- Fuji racing bicycles, 26", ex cond, \$100 ea; Tunturi stationary bike, heart rate monitor, \$150. 244-4570 or 482-6879.

## Audiovisual & Computers

- Brother word processing typewriter, 12k character mem w/unlimited files, auto fonts and formatting, 40 char display, spellcheck, \$200 OBO. Beth, x33078.
- HP DeskJet Plus printer, \$250 OBO; Turbo Pascal Professional 6.0, \$100 OBO; MS Windows 3.1, SDK doc, 10 manuals, \$150 OBO. Ken, 282-4441 or 992-5036.
- Nintendo game sys, 5 pop games, light gun, 5 Nintendo magazines, was \$260, now \$125; Gameboy w/3 games, \$100. Don, 244-4666 or 486-6726.
- Mac Classic, 40/4, kybd, programs, CD ROM, \$1350. Richard, 333-7455.
- Leading Edge 386/DX lap top computer, 20MB HD, was \$2400, now \$650; 286 desktop color SVGA, 65MB HD plus 1.2 and 1.4 HD, \$650. 723-9922.
- Logitech Trackman portable serial mouse for IBM PC and compatible laptop and notebook computers, \$55. Laurie, x35590.
- Seiko CM1450 14", .25 mm dp, 1024 x 768 NI M/S monitor, \$55; C64C/1541C, \$250; C64, \$75; C64 SW, BO; Sharp XT laptop M2100, 2 x DDF, CGA, case, \$550; KayPro II-83 w/c, WS, \$200; lg selection of IC's, ww sockets and tools, PC board supplies, \$80; PC-XT keyboard, \$10; XT mono monitor less p/s and case, \$10; 500kHz oscilloscope, \$20. Jesse, 332-6681 or 996-9641.

## Photographic

- Minolta XG 1 camera w/case, \$95 OBO. Russ, 282-3905 or 554-4942.

## Pets & Livestock

- Male American Eskimo for stud, Purple Ribbon, AKC, 35 lbs. Jack, 480-8629.
- AKC Miniature Schnauzers, 6 wks, \$200. Sheri, x37451 or 538-1263.
- Two 3 yr old cats, m-f, neutered, spayed, declawed, free. 996-8161.
- Sheltie puppy, wht/blk/sable. 771-1012.

## Musical Instruments

- Winter console piano, good cond, \$500. 481-4571.
- TASCAM 32 2-track recorder, new cond, \$875 OBO. Ron, 474-3612.
- Tama drum set, 6 toms, bass drum, snare, 3 cymbals, hi-hat, color blk, solid wood, \$750. Richard, 333-7455.
- Wards elec organ, recent overhaul and tune up, \$75. 835-3200.

## Household

- Whirlpool washer, \$140; Hot Point washer, \$175. 998-8821 or 282-4303.
- Kg sz headboard, comforter, dust ruffle, shams, dk green/beige. 474-3517.
- Full sz Sesame Street comforter and sheet set, fitted and flat sheets, primary colors w/white background, \$25. Michele, x35188.
- Earthtone love seat w/matching chair, maple trim, \$75; 4 wrought iron game chairs, \$50; pecan dining table w/leaf, \$50, all good cond. x35376 or 943-3842.
- Eureka upright vacuum cleaner, 6.5 amp, like new, \$90. Linda, 244-9658 or 486-6873.
- Wicker settee, 2 chairs, table, footstool, double woven, was \$1000, now \$400. x32962 or 482-5398.
- Carpet, 2000 sq ft, 2 yr old, ex cond, BO or will consider donating to good cause. 486-8716.
- Contempo BR set, dbl, triple mirror, armoire, 2 night stands and lamps, \$500; Magnavox color TV, 25", cable ready, \$150. x47177 or 471-2133.
- Wood bunk beds, complete, \$100; dresser w/mirror, \$50. 332-0330.
- Wards gas dryer, \$150, Sears Kenmore washer, \$170 both \$300; Wards 20 cu ft refrig/freezer, \$300, can deliver. Rick, 244-7003.
- Litton microwave oven, 600 watt, 0.6 cu ft "Futura" model, wht, ex cond, \$80 OBO. Rick, x48842 or 538-4278.
- Lg GE microwave oven, multi pwr settings L-M-H and time control setting, \$37. Patricia Gayle, 283-6362.
- French Provincial sofa, fruit wood, beige upholstery, ex cond; Bimini top for CJ7, blk; Remington Rand typewriter. 941-3262 or 283-4849.
- Twin mattress, box springs, frame, ex cond, \$125. Karen, 480-1658.
- Entertainment center, whitewashed oak, ex cond, \$450. 480-9425.

## Wanted

- Went roommate, male preferred, 20-30 yrs old, to share apt w/female and child, \$150/mo + 1/2 util. 478-4807.
- Want 2 to 4 tickets for Astro/Ranger April 2 game. x30017.
- Single parent support group forming for Bay Area, educationally intensive, first

meeting Mar 31. Single Parent Network, 486-2148 or 639-7491.

Want part time kitchen help at Gilruth Center, waitress, dishwasher positions, evening shift 4:00 p.m. to 9:30 p.m. Pat, x30326.

Skaters, join the Suburban Animals, in-line quad welcome. Mike, x36632 or Keith, x38024.

Want mono monitor and kybd for XT/AT computer, cheap. 436-1178.

Want full sz box spring and wrought iron patio table and chairs. x33786.

## Miscellaneous

- French Provincial sofa, fruitwood, biege upholstery, ex cond; Bimini top for CJ7, blk; Remington Rand typewriter. 941-3262 or 282-4849.
- Jansport M-series backpack, used once, \$165. Russ, 282-3905 or 554-4942.
- '90 Upper Deck baseball cards, low no. foil boxes, rookies include, J. Gonzales, D. Palmer, J. Olerud, L. Walker, and K. Maas, \$35. Floyd or David, 482-7005.
- Electronic typewriter, Canon TypeStar 6, compact, lt weight, cordless, thermal transfer printing, text display, 2000 char memory, extra carriage, BO. Linda, 244-9658 or 486-6873.
- AK-47 rifle, \$280. John, x36956 or 332-1570.
- Exercise equip, rower, \$40; skier, \$30; spring stepper, \$20, all three, \$75. x32962 or 482-5398.
- Commercial shop vac, \$75; gas pwr "Weedeater", \$25; 2 hvy duty jack stands, \$40; Wilson golf irons, \$50; "Highjacker" truck jack, \$50. 283-5125.
- Sm utility trlr, 6 ft bed, ex cond, big wheels, \$250. x35180 or 326-3706.
- NSA sinktop water filter, \$80; Florida vacation pkg for 2 incl Bahama cruise, use by June 30, 1993. \$300. 333-0963.
- Craftsman rear bag lawn mower, 4.0HP, cast iron body, \$75. x38395 or 992-3249.
- Two rt tickets to Memphis, TN or Wichita, KS from Hobby, leaving pm Thurs 4/8, returning pm Sun 4/11, \$275 for both OBO. Tony, x38839 or 286-8191.
- Exermate 2000 stationary bicycle, ex cond, \$50; student desk and chair, \$40 both. x38960.
- Coffee table, \$12; floor lamp, \$20; trlr hitch, \$25; radio, stereo w/speakers, \$30; Barbie dolls, ex cond, in box, '82 Hawaiian, '83 Sun Gold Malibu, \$15. 488-6521.
- Golf clubs, Dunlop Max 357, complete set, new grips, Wilson bag, \$175 OBO. Monte, 286-3125.
- Canon 135mm lens, \$30; Telex pilot headphone and microphone, \$25. 474-3517.

# A Challenge to Change:

## NASA's Nonlinear Path to the Future

[Editor's note: The following is the abridged text of NASA Administrator Daniel S. Goldin's speech to the American Astronautical Society at its March 10 Goddard Memorial Symposium in Arlington, Va.]

I think all of us realize that we truly stand at a crossroads. There is change in the air, and there are the inevitable questions and concerns that arise whenever change reaches out and propels us in a new direction.

And so I want to address the questions that are out there, I want you to understand the motivations that are taking us in a new direction, and I want to discuss what all of us—together, as a team—are going to have to do to move this great enterprise down a new and productive path.

I'm sure all of you are aware that President Clinton feels very passionately about the health and welfare of America's technological base, and about our ability to create high-tech, meaningful jobs for our people. The Administration also is concerned about the nation's eroding share of the worldwide aerospace market, and as the defense industry retools for civilian pursuits, it becomes clear that we must move ahead; we must embrace change....

The NASA that President Clinton has inherited will be 35 years old on the first of October of this year. It is an agency that was born at the height of the Cold War, as a direct result of Sputnik, and as a means to project national prestige into the new ocean of space.

Our primary mission, through all the years of adolescence and early adulthood, was to project and display America's technological expertise. We did that, and we did it well. We sent people into space, we landed on the Moon, and we completed humanity's first reconnaissance of the solar system and the universe. We carried the flag, and we did it proudly.

In order to do those things, we have for three decades invested a significant portion of our budget in space transportation and space infrastructure. But now, now that the currents of history have swept us into a new age, the role we have played and the investments we have made must evolve....

In this new age, NASA has to do its part. We have to contribute to the deficit reduction, and when the President releases his budget in April, you will see that we are going to do just that.

We can expect no less, we should do no less. And so human and robotic space flight, space science, aeronautics, Earth science, exploration and the pursuit of new tools and technologies have to stand on their individual merits. They cannot be justified under an umbrella of geopolitical necessity. All of this means we have to seek a new level of relevance. We have to make our work meaningful to the American people.

The President wants NASA to play an important role in the renewal of America's technological base. As one of the government's premier R&D agencies, we have key skills and key facilities that can be brought to bear.

The paradox the President faced, however, was how to provide the proper resources for a renewal of aeronautics and an expansion of our cutting edge technology while also preserving NASA's core program of exploration. And meaningful science. And investigations of our home planet's ecosystem. And all of this while at the same time significantly reducing the rate of growth in the NASA budget over the next five years. Again, it was a paradox.

And that is why he has challenged us to come up with a less expensive approach to the space station program. But he hasn't stopped there. President Clinton has asked us to take a holistic approach to the entire budget. We are going to see significantly less growth in the out years, but we also need to invest more in aeronautics, in pumping advanced technology into the private sector, in meaningful science and all the rest.

How do we do that?

The answer is, we have to readjust the balance at long last. We have to shift resources from space infrastructure to these other initiatives that are so

important to the nation.

Change is never easy, but I believe this new direction from the White House is both reasonable and far-sighted, and it will provide NASA with a rich and promising future. And an opportunity for renewal.

For all of its history, NASA has been a mission-oriented agency, and those missions will continue. We will continue to investigate the problems of flight and seek their solution; we will continue to mount piloted and unpiloted expeditions to chart the unknowns of space. And if we invest wisely, if we are willing to move in new directions, we can enrich those missions that are so important to the future of the country.

But we also have to help invest in a technologically promising future for our children and their children. We have to add our energies to the larger effort that is helping to rebuild America. We have to continue to provide a stimulus to American science, engineering and technology; we have to become a crucible of innovation. We have to become relevant in a post-Cold War world.

We can't do that by hanging onto the past, nor can we succeed if our goal is simply to re-invent Apollo. We should salute Apollo, we should learn from the triumphs of Apollo, we should be grateful for the lessons and the glory it gave us, but now we must move beyond those memories, transcend those past days, and seek a higher order of achievement.

We have heard a clarion call in the last few weeks from the President and the Congress to do exactly that. We are working with the Administration and the House and the Senate to lay out a plan for taking NASA in this new direction. The space program is America's program, and as we work with our national leaders to put this enterprise on the right track, we are confident that not just NASA's future, but the health and welfare of the entire aerospace community and the future of these great endeavors will provide the impetus to action and achievement.

With that foundation of support for the reforms and changes we are making, all of us can move ahead as a team, confident that now is the time for us to take hold of our fate and write new pages for the history books. Now is the time to give the second and third generation of NASA employees and all the people in the aerospace community the chance for their own golden age.

And we cannot do that on our present course. We are going to have to accept and embrace the challenge to change.

The problems we have had with the space station offer a case in point. The station program represents a great deal of dedication and hard work by our people at NASA and by our friends and colleagues in the aerospace industry, but in the end it is simply too expensive. Without a change in direction, it would have left our community with too little room for growth in other important areas in the years ahead. It would have meant gutting many other important programs. It would have left us with an unacceptable bow wake churning out ahead, threatening to wash away the other meaningful things we do.

President Clinton has challenged us to do better. He wants us to succeed, and to move ahead with a less expensive design, one that builds on all the excellent work that has been done so far, one that minimizes the pain of transition, but one that ultimately works. We trade short-term pain for long-term gain.

The President has asked us to make significant reductions in the development costs of the space station, and to lower the long-term costs of operating it in low Earth orbit. At the same time, he is holding us accountable for placing a meaningful scientific facility in space. He has placed us in charge of our own destiny.

So how do we do that, exactly? We begin with an innovative redesign effort, and that is what Joe Shea and his team

will be working on over the next few months. The exact details will emerge in time, but I would like to sketch for you a broad outline of what we are planning.

Before I do that, I want you to understand that right now there is a great deal of attention being paid to the station and the ways we plan to reshape the program. But don't expect us to stop there. We need change across the entire length and breadth of our programs, and all of us have to get behind that and see it for the cleansing, healthy step that it is or else we can't succeed.

We cannot continue to drag along with 20 year programs! We must be lean and quick and vital and we must do things wisely and efficiently. We need management reform so that NASA is accountable. We need procurement reform so that we can motivate our contractors to higher levels of achievement and

take scientific and commercial advantage of what will amount to NASA's 10th field center, an international research laboratory in the sky....

Critics of the station often say we have abandoned the goal of using it as a stepping stone to other worlds. They are wrong—they simply do not understand the fundamental realities of space flight. Just having a facility there, just having a place to live and work in space provides us with the ability to learn and add to our skills as space travelers. Whether or not you slap a sign on the side of the station that says "Mars or Bust" really doesn't matter. We will learn by doing, and in the process be ready to shove off for distant worlds when the time comes.

So the basic goals of the space station will remain unchanged, and the basic promise of a research laboratory on the high frontier is still out there waiting for us, still beckoning us to achieve, to dream, to dare....

Obviously this is going to mean change within the station program. Some companies will have a different role in the project. But pain equals opportunity. There will be other work in other newly energized programs.

And we are not going to do anything precipitous in bringing this new effort on line. There are adequate funds in the budget to accomplish our goals. There will be some finite dislocation, but in the end we will create additional opportunities by freeing up funds to concentrate on demanding missions that drive cutting edge technology development that can, in turn, be brought back to Earth to catalyze our industrial base.

If we continue with huge, long-term projects, the technology will always be outdated. It won't demand the best of us, it won't drive us to go to the cutting edge, and it won't be of much use in our terrestrial industries.

The President's plan for NASA in the out years envisions an agency that spends significantly less on space transportation and space infrastructure and uses those savings to pump cutting edge technology into the private sector. As we bring the station expenditures down, a far-reaching technology development package built around advanced missions will kick in....

But how do we get there from here? What are the watchwords that should guide us? I would suggest that we can accomplish these things, and learn to do more if we dedicate ourselves to a creative, nonlinear approach in our mission of change....

Let me give you a historical analogy. Five hundred years ago, the sea captains who explored the West African coastline for Prince Henry of Portugal developed an amazingly nonlinear approach to their voyages.

Bound by the limiting winds near the coast which propelled them into the doldrums, often for weeks at a time, they took advantage of prevailing winds far out at sea and developed what was known as the Long Ocean Tack.

To get from Portugal to the South African coast, they would sail to the southwest, across the Atlantic almost to Brazil, before turning eastward again. Although the journey was longer if you plotted it by straight lines, it actually took less time than the more direct route. This was a nonlinear approach to the situation, and it was a brilliant, elegant solution to the specific seafaring challenges they faced.

The analogy to our own space-faring techniques of using gravitational assist to slingshot space probes across the solar system in long, looping arcs, is striking. And nonlinear.

It is this kind of thinking, coupled with our talents in high technology, that can guide our path into the future. For example, traditional linear thinking would say that if a scientific spacecraft was redesigned at 15% of the original cost, it could only achieve 15% of the original science. But that isn't necessarily true. The innovative use of high technology

and a nonlinear approach can change that equation dramatically. You might, for example, launch a lighter, higher technology space probe for 15% of the cost, but get 50% of the planned science return. If you flew two of them, you could realize nearly all of the science at 30% of the original cost.

The women and men of the Jet Propulsion Laboratory are pursuing this kind of nonlinear approach as they hone plans for a fast Pluto flyby mission. They have taken up the challenge to plan this mission for half the cost and half the weight while achieving equal or better science, and I congratulate them for their efforts.

This is how we have to proceed, my friends. These are the kinds of nonlinear, innovative solutions that are being asked of us. And the beauty of the challenge is, it dovetails very neatly with the talents and skills of our people....

I believe NASA has the potential to be the ultimate "can-do" agency, a model for productivity and excellence in government, a clearinghouse for new ideas and a place where our very culture celebrates innovation and an inevitable sense of moving forward.

As we begin to see the effects of President Clinton's advanced technology initiative, we will be reaching out to our partners and colleagues in universities and research laboratories, we will be inspiring and fueling the companies of the future, and bringing newer and better technology applications into the hands of the American people....

We will build smaller spacecraft—but lots of them—and do so with much lower budgets and much faster development timelines.... Instead of launching two or three spacecraft a year, we will launch one a month. Instead of requiring 10 to 20 years of a principal investigator's career to see an instrument or experiment go from the laboratory work bench to space, we will get them there in three to five years.

Mission to Planet Earth, perhaps one of the most important projects we've ever undertaken, will be helping us better understand the ecosystem and the dynamics which drive the mechanisms of the Earth.

The renewal of our aeronautical base will mean more modern, more productive wind tunnels that see industry as the primary customer. We will push the technology forward to develop environmentally sound, quiet, safe and economical supersonic flight.

We will re-energize the genius of American aerospace and leapfrog ahead with new designs and new aircraft, from subsonic and short-haul to supersonic, and we will have an entirely new playing field of our own construction, one that stretches across a trillion dollar marketplace.

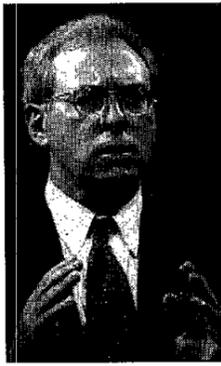
NASA will again be a technology leader and will help to drive industry forward in other areas, such as robotics, micro-electronics, micro-mechanics, artificial intelligence, advanced composites, advanced metals and a variety of other applications.

Our outlook, our capacity to prosper is directly proportional to our ability to seize the opportunities of a new day. We must take the current when it comes, and right now the current is rushing toward new directions and new vistas of opportunity.

As we take this new direction, we must not forget that NASA's other mission, perhaps its most important mission, is to inspire. We represent adventure, discovery, the thrill of peeling back the layers of the unknown. We bring hope to those who look up at the stars and wonder; we bring a gleam to the eyes of children who want to fly fast and go far and seek out new spheres of knowledge. We represent optimism that science and technology can improve our lives here on Earth and help us understand our place in the cosmos.

None of that changes with our new direction. The only real difference, when you take it down to a fundamental level, is that we now are resolved to pay as we go. And to make it pay off for America.

We represent the best that America has to offer, and our people have the talent, the will and the dedication to move ahead with confidence and a bold agenda. Now is the time, now is the opportunity, and the horizon is that way. Let's head for it together. □



**'We need change across the entire length and breadth of our programs, and all of us have to get behind that and see it for the cleansing, healthy step that it is or else we can't succeed.'**

—NASA Administrator Daniel S. Goldin

accountability, and we need reform in our reporting mechanisms, so that we have better and more timely projections that give us the ability to take timely action where necessary.

We are in the process of briefing the Administration and the Congress on these steps to achieve internal reforms in the way we do business. The first part of the package will be announced in the next few weeks, and there will be other measures over the coming months as we continue to shepherd the civil aerospace enterprise into a new and prosperous direction.

It is no longer acceptable to launch successfully but have overruns and schedule slips along the way. Our standards for achievement must not simply begin and end with a successful departure from the launch pads. We must regain the confidence of the people who pay the bills.

And so the first fundamental premise in redesigning the station is, we have to make a firm commitment to build this facility and get it into orbit by the end of this decade. We cannot listen to the naysayers, we cannot fall back and lament that this is some sort of Greek tragedy, doomed to failure. The NASA that opened up the skies and sent us to the planets didn't think that way. And we can't think that way now! We can't be afraid. We must be innovative.

We have to get on with this program, and so we intend to have the new station in its operational configuration and in orbit before the end of the decade. Period. We are committed to working closely with our international partners.

We have committed to building the station for a significantly smaller development budget, and we have to drastically reduce the number of assembly flights. We must ensure that assembly of the facility will require minimal space walk activity by our astronauts—not hundreds or possibly even thousands of hours of EVA time.

We do not want the station to be 100% dependent on the space shuttle. We must explore other means of access to this truly international facility in orbit.

Like the blending of metals to make a stronger alloy, we and our international partners can build a stronger and more effective space enterprise if we work together.

We no longer are in a position to try to build a huge infrastructure that operates for decade after decade in space. When we decided to build the station with a 30-year lifetime, we aimed high, but the reality is we simply cannot afford that approach.

We will pay as we go, in other words, and the litmus test of success will be the effectiveness of the science, and the ability of the user community to

# Cohen shares perspective with JSC employees

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by Assistant Deputy Administrator Joseph Shea includes six JSC employees: Space Station Chief Engineer Doug Cooke, Space Station Freedom Deputy Manager for Integration Rick Nygren, Astronaut Bonnie Dunbar, Mission Operations Deputy Director John O'Neill, Propulsion and Power Division Chief Chet Vaughan and Flight Crew Operations' Brenda Ward. Engineering Director Henry Pohl will lead JSC's support of the redesign effort from here, he said.

## Mission Control viewing room, cafeteria hours

The Mission Control Center viewing room will be open to JSC and contractor badged employees and their families during STS-55.

Based on a Sunday launch, employees will be allowed to visit Monday, Tuesday, Thursday and Friday, from 11:30 a.m.-2:30 p.m. and 5-7 p.m.; Saturday and Sunday, from 3-5 p.m.; and March 29, from 11:30 a.m.-2:30 p.m. and 5-7 p.m.

Employees must wear their badges and escort family members. Children under 5, flash photography or loud talking will not be permitted.

For the latest information on the schedule, call the Employee Information Service at x36765.

The Bldg. 11 cafeteria will be open from 6:30 a.m.-2 p.m. weekdays, except launch and landing days. The Bldg. 3 cafeteria will be open normal hours from 7 a.m.-2 p.m. weekdays.

## Stars of Spring party planned

The JSC Astronomical Society and Harris County Precinct 1 will host a free "Stars of Spring Party" from dusk to 10 p.m. Saturday at Challenger 7 Memorial Park on NASA Road 1 West.

The public is invited to view the stars, the Moon and the planets of the spring sky; telescopes and movies will be available.

For more information, call Bill Williams at 339-1367.

## BEPC plans tax seminar

The dreaded April 15 deadline for filing income taxes is approaching, and the Black Employment Program Council has planned its next brown bag luncheon seminar on tax information and electronic filing.

C.B. Collins, a taxpayer service specialist for the Internal Revenue Service, will address questions about returns and filing procedures at 11:15 a.m. March 30 in Rm. 216-218 of the Gilruth Center.

In addition, The BEPC will sponsor a Financial Management Forum on topics such as pre-retirement, social security and post-retirement April 13.

For more information, call Katherine Coleman at 486-1984, or Charles Hoskins at x30607.

## Open season for group life insurance

March 29 through April 30 will be open season for Federal Employees Group Life Insurance.

This will be the first open season since 1985, with the main advantage that employees don't have to take a physical examination or meet other special requirements.

Employees may enroll in the basic or any optional insurance, or increase optional coverage if they have already enrolled.

As part of open season, a brochure and revised FEGLI booklet are being distributed to all employees, and a three-minute video will be shown on Channel 3 of the JSC Television Distribution System from 11:30 a.m.-12:30 p.m. daily.

For more information, call Human Resources' Employee Services Section at x32681.

June 1 is the deadline for three new design candidates, he said. The redesign team's progress will be evaluated monthly by the Clinton administration's blue-ribbon panel of outside scientists and engineers, and by teams at JSC, Marshall Space Flight Center and Langley Research Center. When the three designs are approved, each center will be asked to fill in the details on the respective candidates.

In the meantime, JSC is going ahead with the Work Package 2 subsystems critical design review in

April, in part to make sure that any of the work already done is considered for use in the redesigned station. Employees who have specific suggestions on how to use those subsystems in the redesigned station should contact Pohl right away, he added.

Cohen said the one part of the redesign effort that is still missing is the administration's proposed budget, but that should be released by the first week of April.

When asked if the mission statement for the space station has

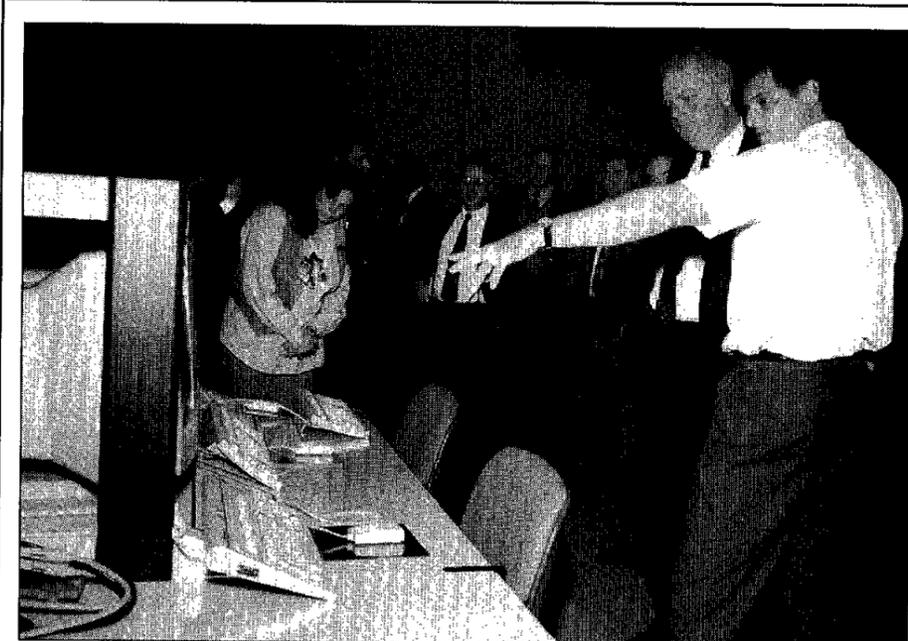
changed, Cohen said that President Clinton feels strongly that the country needs economic stimulus and that one of the ways he plans to get it is by making sure that NASA's research and development has immediate benefits for the people on Earth.

Humans eventually will establish a permanent base on the Moon and travel to Mars, he said, "but we have to show the benefits more firmly before we go on to space exploration."

The first priority must be to get the

redesigned space station and the Earth Observing System operational, which can result in immediate benefits to America and the rest of the world. NASA also must work harder to get the word out on space technology benefits that are improving people's lives, he said, urging everyone in the forum to help spread the word.

"We, who support the human element of space flight, have to have a space station," he said. "I am dedicated to doing everything I can to keep space station on course."



JSC Photo by Benny Benavides

**CONGRESSIONAL VISIT—JSC's Brian Anderson, project manager for the data handling systems in the Space Station Control Center, explains the work being done in Bldg. 30S to visiting Rep. James Sensenbrenner, R-Wis, JSC Director Aaron Cohen and Mission Operations Director Eugene Kranz. Sensenbrenner visited JSC on March 12 to take stock of the center's progress toward building and operating NASA's orbiting laboratory.**

## Board approves senior promotions

JSC's Senior Promotion Board has approved 20 promotions based on expanding job responsibilities and scientific and engineering impact.

The dual career ladder promotions to the GS- and GM-14 and 15 levels were made separate from those selected through the Competitive Placement Plan.

Those receiving promotions, which became effective March 7 are:

Human Resources: Gregory W. Hayes.

Administration: Glen M. Iwai.

Flight Crew Operations: Charles R. Justiz and Dan D. Swint.

Mission Operations: James R. Brandenburg and Richard A. Schmidgall.

Engineering: Richard E. Eckelkamp, Mark M. Hammerschmidt, Steven L. Koontz, Joyce M. Seriale-Grush, David A. Stephenson, Nancy E. Tengler and Eugene K. Ungar.

Safety, Reliability and Quality Assurance: Vincent D. Watkins.

Assured Crew Rescue Vehicle Projects Office: Brian K. Kelly.

White Sands Test Facility: David B. Harris.

Space and Life Sciences: Everett K. Gibson, Jr. and Kamlesh P. Lulla.

Space Shuttle Program Office: David L. Ladrach.

Orbiter and GFE Projects Office: Calvin Schomburg.

## Galileo data sets draw interest at conference

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Galileo, a planetary probe launched from the shuttle that swung past the Earth and Moon to gain speed for its high speed trek to Jupiter.

Galileo's flybys provided coverage of new and little-explored regions of the Moon. The pass in 1990, for example, included coverage of the western limb and the Orientale basin region including some of the far side of the Moon, as well as the western part of the near side. The 1992 flyby provided coverage over the north polar region and northeastern limb.

Galileo's instruments provided better identification and characterization of regional geologic units as well as wider geographic coverage. This information, augmented by future missions, can be used to answer open questions about the history of the Moon, according to a team lead by J. W. Head of Brown University.

Correlation of Galileo and Apollo data provides a form of "groundtruth" to constrain interpretation of far side units. The comparison also illustrates the synergy that will be achieved with future global data sets, the team said.

Mars was the focus of several LPSC discussions including one study which states that relatively young crystallization ages and the composition of trapped volatiles has convinced scientists that the so-called SNC meteorites are actually pieces of the Martian surface that were blasted off the planet to eventually arrive on Earth as meteorites.

A team of researchers including Dr. Haraldur Karlsson of Texas Tech University and Dr. Everett Gibson of JSC has analyzed oxygen isotopes in the water and carbon dioxide extract-

ed from a suite of meteorites representative of the chemical and mineral classes thought to be from Mars.

The team examined oxygen isotopes and carbon isotopes extracted from the Martian meteorites. The results suggest that there may have been separate reservoirs of carbon isotopes for the lithosphere and the atmosphere. The source of atmospheric carbon may have been non-Martian—perhaps from comets. The inhomogeneous isotopes support the contention that Mars lacks plate tectonics.

## JSC employees receive agency's top honors

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presented to Donald H. Emero of Rockwell International.

Outstanding Leadership Medals were presented to Steven G. Bales, Norman H. Chaffee III, Kenneth B. Gilbreath, William R. Kelly, Charles R. Lewis, Harold S. Stall, Lawrence S. Bourgeois Jr., Bonnie J. Dunbar, Ph.D., Philip C. Glynn, Mark C. Lee, Donald E. Robbins, Ph.D., and James D. Wetherbee.

The Exceptional Scientific Achievement Medal went to Duane L. Pierson, Ph.D., and Exceptional Engineering Achievement Medals were bestowed upon Jane T. Malin, Ph.D., and R. Kevin McCluney.

Recipients of the Exceptional Service Medal were Cheryl R. Andrews, Lambert D. Austin Jr., Michael A. Baker, Frank W. Brizzolara Jr., Franklin R. Chang-Diaz, Ph.D., John E. Cools Jr.,

Randy K. Gish, Jeffrey M. Hanley, Kathleen T. Hosea, Tamara E. Jernigan, Ph.D., Charles A. Lauritzen, Thomas G. Mancuso, Carl J. Meade, Ned J. Robinson III, Earl Rubenstein, William M. Shepherd, Billy G. Smith, John F. Stanley, Ralph J. Taeuber, Gary D. Wessels Sr., Richard D. Whitlock, Jerome Apt, Ph.D., Ellen S. Baker, M.D., Susan A. Braymer, Lewis O. Casey, Cinda Chullen, Jeanne L. Crews, Charles J. Gott, Jeffrey A. Hoffman, Ph.D., Marsha S. Ivins, Catherine D. Kramer, Chin H. Lin, Ph.D., Bobby G. Martin, Howard L. Renfro, Henry A. Rotter Jr., Charles W. Shaw, Donald F. Simanton, Carol Jean Smith, Joel M. Stoltzfus, Charles L. Veach and David J. Westfall.

Exceptional Achievement Medals went to Michael D. Axline, Richard H. Campbell, Gloria F. Demers,

Kathy L. Green, Glen M. Iwai, Janet T. Montoya, Donald C. Brown, Emily G. Darnell, Susan H. Garman, Sidney M. Gutierrez, John J. Kennedy and Angel L. Plaza.

NASA Public Service Medals were presented to Joe M. Bailey Jr., Post Oak Bank; William L. Cottrell, Rockwell International; John W. Kiker, parachute consultant; Gerald L. Kulcinski, Ph.D., University of Wisconsin; R. Bowen Loftin, Ph.D., University of Houston; and John E. Walsh Jr., Friendswood Development Co.

Group Achievement Awards were presented to the 100-Percent Facilities Condition Assessment Team, the Atmospheric Reentry Materials and Structures Evaluation Facility Modification Team; the Facility Work Request Process Evaluation Team; the First Lunar Outpost Design Team, the Image Access and

Management System Development Team, the Information Systems Contract Source Board Team, the Information Systems Directorate Customer Services Team, the Microwave Scanning Beam Landing System Procurement team, the Multifunction Electronic Display Subsystem Evaluation and Negotiation Team, the OV-105 (Endeavour) Flight Readiness Firing Team, the Shuttle Body Flap Deflection Measurement Team, the Shuttle Orbiter Repackaged Galley Development Team, the Space Shuttle Abort Panel team, the Space Station Work Package 2 Restructure Definitization Team, the Standard Interface Rack Development Team, the Station-Exploration Support Office, the STS-46 Tethered Satellite Operations Team and the STS-49 Rendezvous, Proximity Operations and Extravehicular Activity Team.

## Reck to head technology program

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measures to strengthen NASA's space programs and the commercialization of technology.

The Office of Advanced Concepts and Technology has been formally established with Gregory Reck as acting associate administrator. Reck had been as director of the Space Technology Program at NASA Headquarters.

In the Office of Aeronautics, Dr.

Kristin A. Hassenius has been named deputy associate administrator. She has been the director of aeronautical research in the Office of Aeronautics.

Goldin has named Deidre A. Lee as associate administrator for procurement. She has been acting in that position since early January and had been deputy associate administrator of procurement since September 1992.

## Space News Roundup

The Roundup is an official publication of the National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Texas, and is published every Friday by the Public Affairs Office for all space center employees.

## Columbia crew ready

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ual cells and cell cultures and humans. Experiments in the cargo bay will study the environment in low Earth orbit, exposing various materials to space.

The Red Team—Precourt, Harris and Schlegel—will be on shift mainly during the daylight hours in Houston while the Blue Team—Henricks, Ross and Walter—will be on a shift at night. Nagel will set his own hours.